

can not be operated.³⁴ Until there is a resolution of these issues, an L-band frequency assignment plan is only a partial step towards reaching the settlement ultimately needed to conclude this proceeding.

D. Proposed Modifications To The Commission's
Frequency Plan Proposal

In addition to the general conditions described above, a number of specific modifications are needed to the Commission's frequency plan proposal.³⁵ In addition, Constellation also replies below to changes proposed by other applicants in their initial comments.

1. The Commission Must Establish Now The General
Principles And Procedures Under Which It Would
Restrict MSS Transmissions In Any Parts Of The
1610-1626.5 MHz Band In The Future

Under the Commission's proposed assignment plan, CDMA subscriber units would have access to the entire 1610-1621.35 MHz band on an interference sharing basis with other CDMA systems.³⁶ Constellation believes that this 11.35 MHz of L-Band spectrum is the minimum needed to support competitive CDMA systems operating in an interference sharing environment. The concern has been raised,

³⁴ See Section VIII below for a detailed discussion of this issue.

³⁵ See Notice at paras. 30-35.

³⁶ As an exception, subscriber units would be restricted to the 1613.8-1621.35 MHz band when located within the radio astronomy protection zones specified in §25.213(a)(1) of the Commission's rules.

both by the Commission³⁷ and LEO applicants, that transmissions in parts of the CDMA band segment may be restricted in the future by the need to protect other services. In particular the concern has been expressed that MSS operations might be restricted in the 1614-1616 MHz portion of the band in order to protect Glonass.³⁸

Constellation proposed that the Commission adopt a specific contingency plan to cover such an event should it occur.³⁹ LQP and Motorola have objected to such a contingency plan.⁴⁰ Irregardless of the need for a contingency plan, all of the LEO applicants support a basic approach to solving the Glonass problem which is discussed in Section V.B below.

Constellation's proposal for inclusion of an explicit contingency plan is based on the lack of explicit Commission commitment in the Notice to insure unfettered MSS operations throughout the entire 1610-1626.5 MHz band.⁴¹ If the Commission endorses this position as the policy of the U.S. government and does not impose

³⁷ See Notice at paragraphs 53-58 at 29-31.

³⁸ Apparently, the Russian administration has agreed to cease operations of the Glonass satellites in the 1610-1614 MHz portion of the band in order to eliminate interference to radio astronomy.

³⁹ See Comments of Constellation at 25-26.

⁴⁰ See Comments of LQP at 69 and Comments of Motorola at 42-47.

⁴¹ This lack of commitment is reflected both in the Commission's discussion of this issue in the Notice, as well as the Commission's proposals in §25.213 that place all of the burden of resolving the sharing issues between MSS and Glonass completely on the MSS. In addition to co-channel restrictions, concerns have also been raised that there may also be interim out-of-band emission constraints on the frequencies available for MSS operations. See e.g. Comments of TRW at 68.

any initial operating restrictions on CDMA LEO MSS systems,⁴² Constellation would not insist on an explicit contingency plan.

There are three possible scenarios facing the LEO applicants on this matter. The first scenario is the most desirable one in which the Russian Administration agrees to operate Glosnass below 1606 MHz and there is international agreement that no restrictive GLONASS out-of-band emission standards would be applied that would impair the operations of a MSS transceiver. Under this scenario there would be no need for operating restrictions on MSS systems or for any contingency plan.

Under the second scenario, the Commission would state in its Report and Order in this proceeding that it will not protect GLONASS above 1606 MHz and it will not impose restrictive out-of-band emission limitations on MSS traneivers. Under this scenario all systems will be licensed and operate in accordance with the Commission's L-band assignment plan. In this case, the Commission would only have to state in its Report and Order that it will apply certain general policy and procedures in the event the Commission is obligated to impose restrictions in the future due to unforeseen events. Specifically, any limitation on the operating frequencies available to CDMA systems must be specified before the first LEO system is placed into operation. The Commission can not allow one system to begin operations on an unrestricted basis and then attempt to impose operating

⁴² This includes modifying the proposed § 25.213(c)(1) of the rules as indicated in Appendix A to these comments. See Section V.B below.

restrictions on the first and subsequent systems. In addition, if a limitation is to be imposed, the spectrum available to all systems should be reduced in a proportionate amount.⁴³

The third scenario is where the Commission is unwilling to state a U.S. position in its Report and Order that it will not protect GLONASS or that it will not impose restrictive out-of-band emission standards. Here, a contingency plan is needed and would become effective immediately prior to the time the first system becomes operational unless a resolution of the Glonass issue is achieved along the lines described in the proceeding two scenarios.

Constellation wants to reiterate that it strongly believes that the Commission's L-band assignment plan is not a viable solution to this proceeding if operations of MSS systems are restricted in order to protect Glonass to the levels currently advocated by the aeronautical community. Constellation is willing to proceed under the third scenario with the constraints of a contingency plan only as a temporary measure while progress is being made towards an acceptable resolution of this problem. However, only the first two scenarios described above can provide a satisfactory basis for the Commission's L-band assignment plan.

⁴³ Proportionate reduction means that each licensee's relative share of the assigned spectrum would be reduced proportionately. For instance, if the entire 1610-1616 MHz band was unavailable, the FDMA/TDMA band would be reduced 36.4% ($6/16.5=36.4\%$ of the original assignment), or from 5.15 MHz to 3.28 MHz. Likewise, the CDMA band would be reduced from 11.35 MHz to 7.22 MHz.

2. The Commission Should Explicitly Address Certain Other Contingencies That May Arise In The Course Of Implementing Its Plan

Two other contingencies are identified in the Comments which Constellation agrees should be addressed in the Commission's Report and Order. These are (i) what happens if only one CDMA system (or no FDMA/TDMA) system is placed into service and (ii) what happens if applicants amend their applications to request authority to operate in the FDMA/TDMA portion of L-band.

The Commission has proposed a 8.25/8.25 MHz split of the L-band spectrum if only one CDMA system becomes operational.⁴⁴ Although Constellation did not express a position on this issue in its original Comments, it does support the proposition that a single CDMA system should not be required to reduce its operating bandwidth to 8.25 if no other CDMA systems are placed into operation.⁴⁵ Constellation also supports the proposals that CDMA systems be afforded access to the upper part of the band if no FDMA/TDMA is placed into service.⁴⁶ Constellation believes that if there is no FDMA/TDMA system and there are two or more CDMA systems in service, the CDMA operators should be allowed to

⁴⁴ See Notice at para 33.

⁴⁵ See Comments of LQP at 36-41, Comments of TRW at 63-65.

⁴⁶ See Comments of Ellipsat at iii and 27 and Comments of TRW at 65.

operate over the entire 16.5 MHz in order to increase capacity and/or link margins under the interference sharing environment. If there is only one CDMA system and no FDMA/TDMA system, the CDMA operator should have the option of continuing to operate in the 1610-1621.35 MHz band or of shifting its operations to the top 8.25 MHz at 1618.25-1626.5 MHz. If the case arises where there is one CDMA system and one FDMA/TDMA system, the CDMA system should operate in the 11.35 MHz at 1610-1621.35 MHz and the FDMA/TDMA system should operate in the 5.15 MHz at 1621.35-1626.5 MHz. In this case, a system operator should be required to demonstrate that its system is saturated and that the other system can operate with less bandwidth without reducing the quality of service or system capacity of the other system before the Commission reassigns spectrum from one system to the other.

Constellation objects to the presumption that the 3.1 MHz of spectrum at 1618.25-1621.35 MHz should be made available to the TDMA/FDMA system simply on a showing of need. There is no merit to Motorola's position that it deserves the entire 8.25 MHz if there is only one CDMA system without the type of showing described above. There is nothing in the current record to indicate that loading on the Motorola system will rise to the level where more than 5.15 MHz is needed to satisfy its traffic requirements.

As long as there is one CDMA system operating, it should be allowed to use the entire 11.35 MHz CDMA segment because no reduction in CDMA bandwidth

may be technically feasible,⁴⁷ a single CDMA system might saturate the 11.35 MHz segment,⁴⁸ a single CDMA system may be sharing the 11.35 MHz segment with a foreign system,⁴⁹ bandwidth reduction deprives CDMA system operators of certainty,⁵⁰ and channelization options are different for 11.35 MHz and 8.25 MHz⁵¹. Moreover, as pointed out in Constellation's Comments, the lower part of the L-band is encumbered by sharing restrictions with radio astronomy at 1610.6-1613.8 MHz and potentially with Glonass at 1610-1616 MHz. If only one CDMA system becomes operational, it should be entitled to at least as much unencumbered spectrum as the FDMA/TDMA system which has already been assigned the most desirable portion of the 1610-1626.5 MHz band. Until the Glonass issue is resolved, retaining the 11.35 MHz CDMA band would allow a single CDMA system to have at least 5.35 MHz of unencumbered spectrum between 1616 MHz and 1621.5 MHz, equivalent to the amount of unencumbered spectrum assigned to Motorola.

Another issue that has been raised by some of the other LEO applicants is the possibility of a CDMA applicant switching to FDMA/TDMA. TRW notes that Constellation has not yet formally amended its application to specify that it will

⁴⁷ See Comments of LQP at 6-7, 36-41.

⁴⁸ See Comments of TRW at 64.

⁴⁹ Id. at 65.

⁵⁰ Id.

⁵¹ Id. at 65 and n 102.

operate as a CDMA system.⁵² Motorola indicates that the 5.15 MHz segment will support only one system and that a new frequency plan would be needed if Constellation wants to operate in the non-CDMA portion of L-Band.⁵³ Constellation agrees with Motorola on this point. As discussed in Section III.A above, the Commission must afford each applicant the same opportunities to amend its application as afforded any other applicant. Absent a settlement among the five LEO applicants, the Commission's L-band frequency assignment plan must be designed with the flexibility to allow each applicant the opportunity to select between exclusive band segments or interference sharing in a common band.

3. Certain Technical Issues Should Be Resolved As Part of The L-Band Assignment Plan

Two technical issues were raised in the initial comments which should be addressed as part of the L-band frequency assignment plan. These involve consideration of secondary MSS downlink interference at L-band and the need for guardbands.

TRW expressed its concern that the Commission did not address the issue of interference caused by secondary L-band downlinks into the primary L-band

⁵² See Comments of TRW at 70, n. 109

⁵³ See Comments of Motorola at 36 and 37.

uplinks, particularly in the event that Motorola were to provide service in other countries on frequencies outside of the 5.15 MHz assigned by the Commission.⁵⁴ Constellation shares TRW's concerns. However, Constellation is of the view that the Commission can not unilaterally impose its L-band frequency assignment plan on the rest of the world. In effecting coordination of U.S. LEO systems with other countries, Constellation expects the Commission to protect the primary uplink operations of these systems when providing service within the United States in accordance with the Commission's L-band assignment plan. If other countries decide that a different L-band uplink frequency plan is necessary to meet their requirements, they will have to coordinate that uplink plan with the primary uplink operations authorized by the Commission in order to avoid mutual interference. While the Commission should not dictate operational plans within other countries, it can and should insure that secondary downlink operations of Commission licensed LEO systems do not cause harmful interference to primary uplink operations within the United States. Constellation therefore proposes that the Commission include a condition in any authorization it issues to use secondary L-band downlinks that would require termination of operations in the event that harmful interference is caused to primary uplinks serving the United States operating in accordance with the Commission's L-band assignment plan.

⁵⁴ See Comments of TRW at 134-136.

During the course of the NRM, as well as in some of the initial comments in this proceeding, the issue of out-of-band emissions has been raised. Proposals have been made to limit out-of-band emissions with respect to inter-service sharing as well as with respect to intra-service sharing. With respect to intra-service sharing, Motorola proposes a specific out-of-band emission mask primarily to protect its FDMA/TDMA signals from CDMA signals.⁵⁵

Constellation objects to this proposal for several reasons. First, the specific emission mask is based on intra-service interference considerations which Constellation believes are more effectively addressed under an intra-service coordination procedure rather than by Commission rule. Second, Constellation objects to an emission mask specified in terms of fixed frequency offsets rather than the normal manner of specifying emission masks in terms of frequency offsets as a function of the bandwidth of the emission. The bandwidth dependent formulation of an out-of-band emission mask, as illustrated by the current § 25.202(f), is the normal way of specifying such masks and should be retained in this case as well.⁵⁶ Third, CDMA systems should not be penalized with emission masks at fixed frequency offsets, and particularly at 125 kHz frequency offset which is a small

⁵⁵ See Comments of Motorola at 50-51.

⁵⁶ As illustrated in the Comments of Motorola, Technical Appendix, Figure 1 at 3, the out-of-band emission sidelobes of a digital signal have a regular pattern based on the emission bandwidth and this is why the Commission specifies emission masks as a function of authorized bandwidth rather than fixed frequency offsets.

fraction of the bandwidth of CDMA bandwidth. If the Commission allows Motorola to use a narrow-band transmission technique that is sensitive to interference, it should not impose stringent emission masks on CDMA operators to rectify this problem that is one of Motorola's own making. Fourth, no consideration should be given to potential interference to Motorola's downlink transmissions. As a secondary service, Motorola's space-to-Earth transmissions are not entitled to any protection from interference and should not be allowed to impose any restraints on primary uplink transmissions in the 1610-1626.5 MHz band. Fifth, the Commission should reject Motorola's references to the aeronautical mobile-satellite (R) service ("AMSS(R)") that it uses to support its proposal, especially with respect to its secondary downlink transmissions. There are no AMSS(R) systems licensed by the Commission in this band and Motorola has not applied for an AMSS (R) license in this proceeding. Finally, an out-of-band emission mask should, as recognized by Motorola⁵⁷, consider inter-service interference as well as intra-service interference. However, Motorola provides no inter-service interference technical analysis in support of its proposed emission mask, and, thus, has failed to provide sufficient justification for the rule it proposes. In summary, Motorola's proposed out-of-band emission mask is a self-serving attempt to protect itself against the consequences of its choice of a narrow-band transmission technique. The Commission should reject this proposal. If a more stringent

⁵⁷ See Comments of Motorola at 50-53 and its Technical Appendix.

emission mask than is currently specified in § 25.202(f) becomes desirable as a result of an inter-system coordination agreement, or as a result of new interservice sharing criteria, it should have the same structure as the current § 25.202(f). If guardbands are needed by Motorola to avoid unacceptable out-of-band interference levels in its system from CDMA signals in the 1610-1621.35 MHz band, such guardbands should be located within the 5.15 MHz band assigned to Motorola.

4. The Commission Should Clarify The Coordination Procedures To Be Applied In these Bands

Constellation believes that intra-service coordination is necessary to allow different system architectures to be implemented in an equitable fashion.⁵⁸ Such a coordination mechanism is needed to allow verification of various statistical factors needed to implement a CDMA interference sharing approach, as well as to allow full use of polarization and frequency planning to minimize system costs.⁵⁹

The CDMA applicants generally support the need for such a coordination process and the basic procedure presented in Constellation's comments.⁶⁰

⁵⁸ See Comments of Constellation at 27-28.

⁵⁹ Constellation also stated its position that with respect to coordination between FDMA/TDMA and CDMA systems, any required guardbands should be located entirely within the FDMA/TDMA segment. Id. at 28.

⁶⁰ See Comments of Constellation at Appendix D. This document was actually a joint proposal of the CDMA applicants to the NRM Committee as document MSSAC-23. This procedure is essentially the same as the Final Majority Report coordination procedure, Annex 1 to Attachment 1 at 2-1 to 2-3 and 2-12 of the NRM Final Report. (See Comments of TRW at 78 and LQP at 60-62).

Constellation does not believe that this procedure needs to be codified in the Commission's rules, but only that the CDMA operators would implement such a procedure as a condition of their licenses. Constellation does, however, want the Commission to make it clear that it does not require all four CDMA operators to operate across the entire band, but that frequency band planning, particularly at S-band, is permissible if frequency and polarization plans are coordinated among the CDMA licensees.⁶¹ CDMA inherently involves multiple co-frequency transmissions that appears as code noise within the desired signal channel. The question, however, is whether it is more efficient (in terms of satellite power and weight) for the code noise to be produced by other signals in the same system or by signals in another system. At L-band, the inability to synchronize codes (and thus the use of Gold codes) means that the interference effects are about the same whether the co-channel signals are from other users on the same system or from users on other systems. However, at S-band, transmissions on the same system can be synchronized so that orthogonal codes can be used to reduce the interference effects from other users on the same system with respect to the interference effects from users on other systems. Thus, there can be a significant total satellite power saving advantage at S-band from operating synchronous CDMA in a smaller bandwidth on

⁶¹ Constellation does not completely agree with TRW where it states that band segmentation would reduce the capacity of all systems. (See Comments of TRW at 50.) As demonstrated in Appendix B to Constellation's May 5 Comments, a combination of frequency and polarization planning can produce the same capacity as full band interference sharing but at a lower cost to the system operator.

an exclusive basis. Constellation believes that these issues must be examined closely as part of the CDMA coordination process.

Constellation does not completely agree with LQP's proposal for a rigidly structured inter-system coordination procedure in the rules.⁶² Constellation believes the necessary technical discussions with the other CDMA operators should be informal, but does agree that a coordination agreement should be completed as soon as practical after the Commission has issued its Report and Order and final designs have been selected. Although CDMA interference sharing will require ongoing coordination,⁶³ Constellation disagrees with the proposals that the intra-band CDMA coordination requires a formal industry coordinating group and that the Commission should specify baseline parameters.⁶⁴ Constellation believes that the informal coordination framework described above is sufficient to successfully complete coordination once individual system designs are finalized.

Nor does Constellation agree with TRW that the Commission should require that 1.6/2.4 GHz MSS systems "maintain globally the operating parameters

⁶² See Comments of LQP at 41-44, 60-62.

⁶³ Ellipsat correctly characterizes this procedure as "dynamic" sharing among CDMA system. See Comments of Ellipsat at 34; LQP recognizes that coordination is an ongoing process. See Comments of LQP at 42.

⁶⁴ See Comments of Ellipsat at ii and 22-23.

they are authorized to employ over the United States."⁶⁵ Although Constellation shares TRW's concerns regarding competitive considerations and the burden of international coordination, Constellation believes it would be unwise for the Commission to impose its L-band frequency assignment on a global basis. While the Commission's licensing plan will undoubtedly be the starting point for defining the operating authority of U.S. LEO MSS systems in other countries, it is too early to know whether the Commission's proposed plan will be practical in every country served by the LEO MSS systems or whether some adjustments may be needed to accommodate national circumstances.

COMSAT Corporation ("Comsat") indicates its concerns that the Notice "is silent on how the Commission's policies and rules for U.S. authorized global MSS systems will be harmonized with those of other countries expected to be partners and/or users of U.S. authorized system" and "gives no indication of what the U.S. policy will be toward other global satellite systems that may be initiated and authorized by authorities in other countries seeking to operate their systems and provide services within the United States."⁶⁶ Constellation believes that Comsat's concerns are overstated and that these matters will be resolved in the normal course of events of establishing global commercial arrangements to implement the 1.6/2.4

⁶⁵ See Comments of TRW at 80.

⁶⁶ See Comments of Comsat at 3.

GHz MSS LEO systems licensed by the Commission. As recognized by Comsat, these global systems will necessarily involve commercial "alliances, partnerships and mergers"⁶⁷ and Constellation fully expects that the ultimate financing of the LEO MSS systems licensed by the Commission in this proceeding will be provided by a combination of U.S. and foreign entities. However, the application cut-off in this proceeding limits the systems that can serve the U.S. in the 1.6/2.4 GHz bands to the systems proposed by Constellation, Ellipsat, LQP, Motorola and TRW. Thus, while each administration will decide how 1.6/2.4 GHz MSS is to be provided within its territory, each administration must also recognize that the full benefits of a global 1.6/2.4 GHz MSS also require consideration of the Commission's own licensing decisions in these bands. Constellation is confident that the commercial relationships it is building with foreign partners will be fully consistent with the policies adopted by the foreign governments that regulate these partners. Consequently, Constellation believes that the Commission's Notice properly limits its coordination of international issues in this proceeding to those relating to international frequency coordination.⁶⁸

⁶⁷ Id. at 4.

⁶⁸ Constellation opposes any provision of 1.6/2.4 GHz MSS service in the United States by systems operated by international organizations such as INMARSAT. While global maritime and aeronautical service requirements in oceanic areas may justify such systems because of safety considerations, there are no such considerations with respect to 1.6/2.4 GHz LEO MSS systems designed primarily to provide commercial services to land users. For this reason, the Commission should continue the policy formulated in Provision of Aeronautical Services Via the Inmarsat System, 4 FCC Rcd 6072 (1989), and exclude INMARSAT from operating within the United States. This issue has also been raised with respect to the Petition for Declaratory Ruling of Motorola, (filed October 21, 1993).

IV. Only Minor Adjustments Are Needed To The Proposed Qualification Standards And Regulatory Classification Of The 1.6/2.4 GHz MSS Service

In its Notice, the Commission proposed basic technical and financial qualification standards and regulatory classifications for the 1.6/2.4 GHz MSS. Constellation and the other LEO applicants generally supported these proposals,⁶⁹ although a number of modifications were proposed in the initial comments. Only AMSC objected to the technical qualification standard that requires a non-geostationary, global coverage system architecture, and these objections are addressed in Section II above. Constellation believes that the remaining points concerning qualification standards and regulatory classifications can be resolved as discussed below.

A. Technical Qualifications

The two basic technical qualifications proposed by the Commission are minimum global and United States coverage requirements. Constellation expressed its concerns that the proposed rule texts created ambiguity in how they would be interpreted and proposed specific text changes to remove such ambiguity.⁷⁰ In particular, Constellation stated its belief that these technical qualification standards should be expressed as simple geometric coverage requirements that can be readily

⁶⁹ But see Section V below regarding with the proposals concerning inter-service sharing requirements.

⁷⁰ See Comments of Constellation at 37-39 and Appendix A.

verified using commercially available computer software packages. These concerns are also shared by the other CDMA applicants. For example, LQP notes that United States service "on a continuous basis" must be flexible to account for obstructions and satellite failures. TRW believes that "coverage" not a service standard should be basis for any technical qualification.⁷¹ Thus, Constellation continues to believe that the Commission should modify its proposed §25.143(b)(2)(ii) and (iii) as proposed in Appendix A to Constellation's May 5, 1994 Comments.

Constellation therefore objects to Motorola's proposals to modify these standards to make them into "service" rather than "coverage" requirements.⁷² Motorola proposes that the elevation angle be system specific based on stated service quality. Constellation objects to this proposal because such a subjective rule opens the door for confusion and delay by allowing competitors to file petitions to deny claiming the system doesn't meet its stated goals. Only a simple, geometric coverage standard easily verifiable by commercially available computer software packages is practical as a basic technical qualification standard.

The Commission proposed coverage standards require the system to have at least one satellite visible above 5° elevation angle for 75% of the time for all non-polar areas below 80° latitude, and at least one satellite visible above 5° for

⁷¹ See Comments of TRW at 26-31.

⁷² See Comments of Motorola at 18-21.

100% of the time in the United States. Ellipsat proposes a global coverage requirement of a 15° elevation angle between 55° South and 75° North latitude and USA coverage requirement at a 25° elevation angle.⁷³ In its Comments, Constellation proposed 65° North and South latitudes as limit of non-polar regions.⁷⁴ LQP proposes 75° North and South latitude limits for non-polar coverage.⁷⁵

Appendix B illustrates coverage statistics for eight orbital constellations, three at 1,000 km altitude and five at 2,000 km altitude, which are likely candidates for a global coverage system of 40 to 48 satellites. It should be recognized that these options involve cost-coverage tradeoffs, with higher altitude and more orbital planes resulting in higher system costs. With respect to the rule proposals, it should be noted that coverage of 80° North Latitude at 5° elevation, 75% of the time is not achieved for two of the options while 5° elevation coverage of Northern Alaska at 71° North Latitude is achieved 100% of the time in all but one case. For this reason, Constellation can support LQP's proposal that the global coverage requirement be specified at a 75° maximum latitude.

Constellation objects to Ellipsat's proposal that the United States coverage requirement be increased to a 25° elevation angle. For circular orbits, it is difficult

⁷³ See Comments of Ellipsat at ii.

⁷⁴ See Comments of Constellation at 38.

⁷⁵ See Comments of LQP at 20.

to achieve the 5° elevation angle coverage 100% of the time throughout the United States at an altitude 1000 km.⁷⁶ Thus, there should be no change made to the elevation angle for United States coverage proposed in the Notice.

Constellation believes that no other technical standards are necessary or desirable. In particular, Constellation opposes a minimum capacity rules, such as proposed by LQP. Constellation finds no merit in the rationale for 1500 CONUS channel capacity (or maximum single beam coverage) efficiency rule. Such a rule is entirely inappropriate for a new technology and service and is likely to be unenforceable. Coordination between systems in an interference sharing environment is done on the basis of aggregate downlink power flux density and aggregate uplink areal EIRP density. Thus, the interference environment does not depend on the number of channels provided by a LEO system, while the system capacity will depend on the coordinated interference power levels. An arbitrary minimum system capacity (or maximum single beam size) requirement, such as the one proposed by LQP, is not needed to implement CDMA interference sharing. However, verification of system capacity showings will undoubtedly embroil the Commission in detailed and arcane evaluations of every aspect of a system design parameters and link budgets. Each system should be allowed to evolve in a manner consistent with its unique business plan and vision.

⁷⁶ Polar orbits at 1000 km provide the necessary coverage in the northern points of the country but not in the southern parts, while inclined orbits provide the necessary coverage in the southern parts of the country but not in Alaska.

B. Financial Qualifications

In its comments, Constellation requested that the Commission recognize the special features associated with the LEO MSS and that the Commission take a flexible approach in developing and implementing financial qualifications. In this regard, Constellation indicated that the financial qualifications initially specified for the Radiodetermination Satellite Service ("RDSS")⁷⁷ would be most appropriate for this emerging service. The other comments ranged from strict implementation of the Commission's proposal on financial qualifications to a more liberal and equitable standard. All the applicants supported the concept that committed funds not be used as the basis for determining their individual financial qualifications.

Certainly, the goal of financial qualifications should be to ensure that the spectrum resource is not controlled by licensees that are incapable of implementing their systems. The comments reveal two important points with regard to this goal. First, all applicants agreed that all pending LEO applicants could be accommodated under the framework of the Commission's assignment plan. This means that the grant of one application will not preclude another application. Under this circumstance, it becomes less important to impose stringent financial qualifications. Relatedly, all the applicants supported institution of strict milestones to ensure that spectrum is not stockpiled. These two facts make a much more compelling case for the use of the RDSS financial qualification standards.

⁷⁷ Radiodetermination Satellite Service, 104 FCC 2d 650, 663. (1986).

Although Constellation believes that it can meet the financial qualifications standard proposed by the Commission, it supports Ellipsat's request for equity in the administration of such standards. Specifically, new entrants can not be required to provide evidence of fully negotiated loans and financial commitments while existing companies need only to provide a balance sheet. Certainly, a balance sheet does not provide any greater assurance that a proposed satellite system will in fact be constructed. In the first round of domestic satellite applications subject to the financial qualification standards specified at § 25.140(c) and (d), many of the companies who established their financial qualifications through the submission of a balance sheet, did not construct their proposed systems. This included established companies such as Comsat, Federal Express, Ford Aerospace (now owned by Loral), Martin Marietta, and Western Union. It was not the Commission that made the determination as to the viability of these companies' proposals, it was the market.

To automatically eliminate a new company merely because it can not provide a balance sheet comparable to a Fortune 500 company is patently unfair and does not provide the Commission with any greater confidence that a proposed system will or will not be launched. This is especially true for the 1.6/2.4 GHz MSS where systems could cost as much as \$5 billion. None of the established companies seeking a license in these bands is valued at more than \$25 billion. They will not spend a substantial part of their corporate assets on a LEO MSS system. This is clearly self-evident by the current efforts to obtain strategic partners. There

is no basis to say that Ellipsat will be any more or less capable of developing these strategic relationships than any of the established companies. It is for this reason that Constellation supports Ellipsat's argument that there should not be a bifurcated financial standard where established companies need only provide a balance sheet while emerging companies need to have iron clad commitments.⁷⁸ Rather, the most appropriate approach is for the Commission to implement the existing RDSS financial qualifications that were designed for the bands in question in this proceeding.

C. Regulatory Classification

There is substantial agreement by the commenters that the Commission should not compel 1.6/2.4 GHz MSS system operators to function as common carriers.⁷⁹ Constellation continues to strongly endorse this position. It believes that the Commission should specify that the provision of space segment capacity by 1.6/2.4 GHz MSS system operators to resellers should be treated as a non-common carrier activity. Certainly, the comments reveal that it is likely that multiple systems will be licensed and that a competitive market is likely to develop. This is not a recipe for common carrier regulation. Additionally, resellers of 1.6/2.4 GHz

⁷⁸ Binding commitments are totally unrealistic for this service given the enormous amount of capital and time required. Financing of all the systems will be done in discrete phases. No one is going to put hundreds of millions to billions of dollars of capital aside that are not going to be spent for 3 or 4 years.

⁷⁹ See Comments of Ellipsat at 45-46, Comments of LQP at 96-101, Comments of TRW at 152-168, Comments of Motorola at 61-67, Comments of AirTouch at 3-13.

MSS service that function as Commercial Mobile Radio Service ("CMRS") providers and are interconnected with the Public Switched Telephone Network ("PSTN") should be regulated on a streamlined basis. There is no reason to impose a strict regulatory regime on these new emerging businesses. Finally, Constellation believes that specialized services offered by resellers not interconnected with the PSTN should be treated on a case-by-case basis pursuant to a NARUC II analysis.

Constellation does take exception with the comment made by AMSC⁸⁰ that it should be regulated in a manner similar to other mobile services. Currently, AMSC is authorized as a provider of space segment capacity directly to end users through its own earth stations. AMSC possesses a monopoly position in the domestic MSS market and will directly interconnect into the PSTN. Under these circumstances Constellation does not see any basis to change AMSC's regulatory status.

V. The Commission Should Specify Only The Quantitative Sharing Criteria Recommended By The Negotiated Rule Making Committee In The Rules

In its comments, Constellation expressed its objections to the formulation of inter-service sharing requirements in the rules proposed by the Commission.

Constellation objected to the Commission's proposal in §25.143(b)(2)(iv) to require

⁸⁰ See Comment of AMSC at 16.

1.6/2.4 GHz MSS applicants to make a showing that unacceptable interference would not be caused to other services as a basic technical qualification (as opposed to a post-grant coordination requirement) and to the Commission's proposals in §25.213 that would impose non-quantifiable sharing constraints on the 1.6/2.4 GHz MSS.⁸¹ The following is a review of the interservice sharing issues.

A. Radio Astronomy

Constellation supported the Commission's proposals regarding inter-service sharing with radio astronomy in so far as they reflected the specific proposed rule texts recommended in the NRM Report.⁸² However, Constellation objected to certain provisions proposed by the Commission which went beyond those agreements.⁸³ In particular, Constellation objects to the incorporation in the proposed §§ 25.213(a)(2)-(3) of the criteria for unacceptable interference unilaterally defined by the radio astronomy community with respect to out-of-band emissions without any regard to the impact such levels would have on other services.⁸⁴

⁸¹ See Comments of Constellation at 42-53.

⁸² See Section 5.1 of the NRM Final Report.

⁸³ Constellation also proposed that §25.213(a)(1) be modified to require position determination capability only for mobile earth stations that actually operate in the radio astronomy band. Constellation supports the position of TRW that beacon-actuated protection zones should be permitted, and that such operations do not require position determination capability if beacons are used. See TRW Comments at 120-121, and note 195.

⁸⁴ See Comments of at Constellation 46-49.